

A New Species of *Glauconycteris* (Vespertilionidae, Chiroptera)

by R. L. Peterson¹ and Donald A. Smith²

In a systematic study of the African genus *Glauconycteris* Dobson, we have found a series of white-winged specimens that represent a new species that has not been previously described. The genera (or subgenera) *Chalinolobus* Peters of the *Australasian* region and *Glauconycteris* from Africa are closely related as discussed by Dobson (1875, 1878), Miller (1907), Ryan (1966), Hayman (1967), Hayman and Hill (1971), and Koopman (1971). Arguments have been advanced that all species belong to one genus (*Chalinolobus*), that the two should be considered subgenera, or that generic distinction should be retained for the two taxa, an option that has been widely followed in recent years. We tentatively recognize *Glauconycteris* as a genus pending the results of our own analysis of variation within each of the African species, now in progress.

We have compared the new taxon with all previously described species of *Glauconycteris*, but in our opinion, it needs critical comparison only with *G. argentata* (Dobson) and *G. variegata* (Tomes) as it differs so distinctly either in size or in pelage and wing coloration (or both) from all other

known species. We are pleased to name this new species after Mr. Robert Glen, Nairobi, Kenya, who collected the holotype, assisted in the collection of the Uganda series of the new species, and who has been a field companion *extraordinaire*.

Materials and Methods—A total of 154 specimens of *Glauconycteris* from Africa, representing eight different species, have been examined and measured in this study (see specimens examined). The specimens examined were from the collections of the following institutions: American Museum of Natural History, British Museum (Natural History), Carleton University Museum of Biology, Carnegie Museum, Field Museum of Natural History, Institut Royal des Sciences Naturelles de Belgique, Los Angeles County Museum, Museum of Comparative Zoology – Harvard, National Museum of Rhodesia, Royal Ontario Museum and United States National Museum. All measurements are given in millimetres and weights in grams. The measurements used follow those as defined by Peterson (1972). Specimens were sorted by sex and age, and

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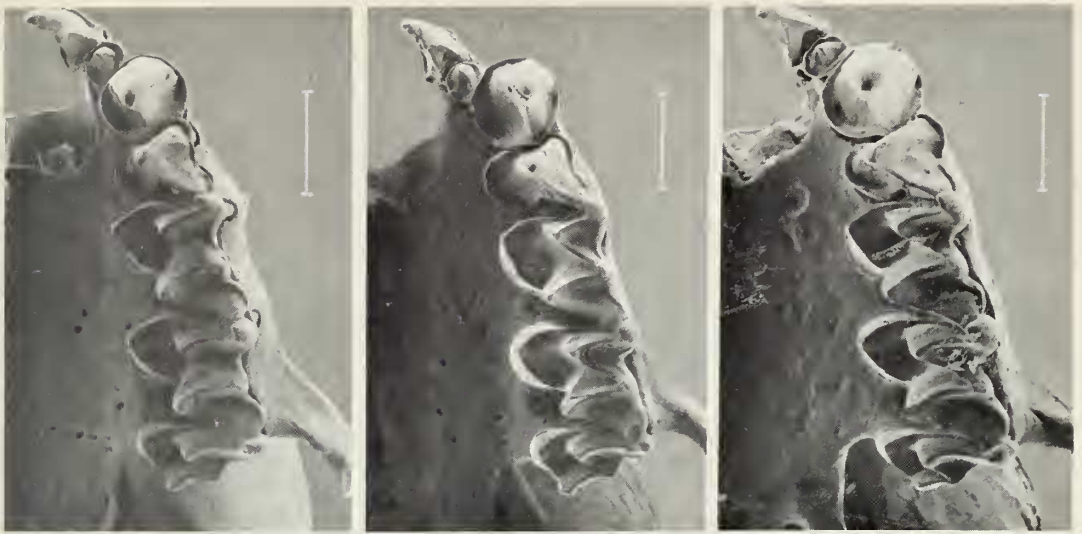


Fig. 2—Upper dentition of three species of *Glauconycteris* (scale bars = 1 mm). Left, *G. argentata* ROM 50501 ♂, Kakamega Forest, Kenya (C-M³ 4.3 mm). Centre, *G. gleni* Holotype ROM 57125 ♀, Lomie, Cameroun (C-M³ 4.75 mm). Right, *G. variegata* ROM 40141 ♂, Budongo Forest, Uganda (C-M³ 4.8 mm).

the measurements were analyzed using an IBM/370 computer at the University of Toronto Computer Centre. The means (\bar{X}) and standard deviations (SD) of all characters were calculated for male and female adults, and the differences in character means between species were examined using Student's *t*-test (*P*). Differences were considered significant at the 0.05 probability level. Selected cranial specimens were photographed with a scanning electron microscope using the technique described by Howden and Ling (1973).

***Glauconycteris gleni* sp. n.**

Holotype—ROM 57125, adult female, skin and skull collected 16 June 1970 by Robert Glen and V. Ngam in a tropical forest region near Lomie, Cameroun, 3°10'N, 13°37'E.

Geographic distribution—Known only from the type locality in Cameroun and from Malabigambo Forest near Sàngo Bay, Masaka District, southern Uganda, 1°05'N, 31°30'E.

Diagnosis—Wings and uropatagium white with dark brown pigment outlining the bones of the wings, hind limbs, and tail, the basal portions of the calcars and veinations of the interfemoral membrane, and to a lesser extent the proximal areas of the wings between humeri and hind limbs (Fig. 1). The ears are relatively large for the genus and have broad tragi. The pelage of the dorsum is quadricoloured with a pale clay-coloured terminal band, a narrow and dark-brown sub-terminal zone, a pale, buffy, sub-basal zone, and a dark slate-gray basal band. There are no distinct dorsolateral bands of pale pelage as in *G. argentata*. Ventral hairs are bi-coloured, with the base gray and the whitish terminal band varying from pure white to a wash of pale yellowish buff. The length of the tibia relative to forearm length is short compared with other species of the genus (Tables 1 and 2).

The size and general shape of the skull of *G. gleni* is similar to that of *G. variegata* but differs from the latter by the combination of a more rounded braincase (equal in

Fig. 1—Dorsal and ventral aspects of the holotype of *Glauconycteris gleni* ROM 57125 ♀ (total length 100, forearm length 41.4).

TABLE I

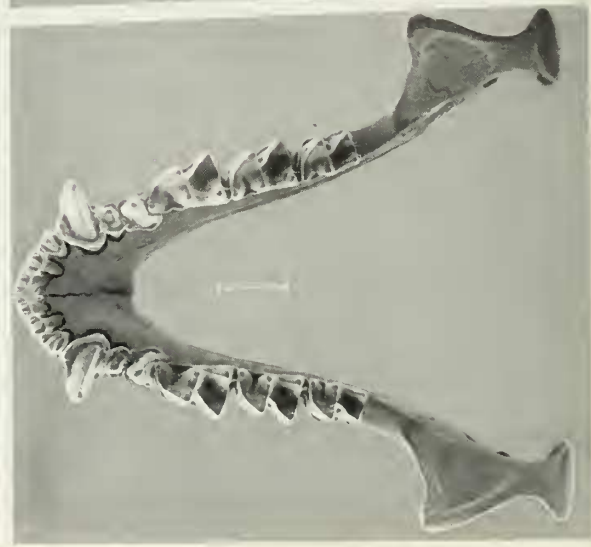
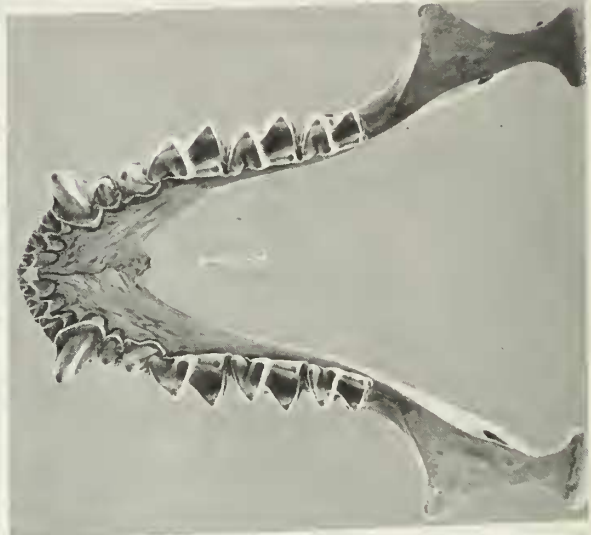
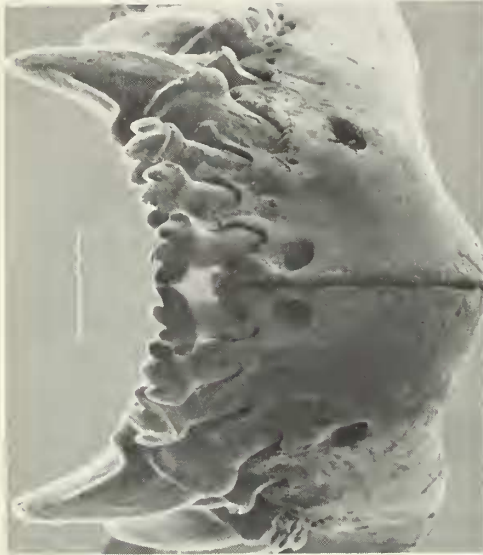
Measurements (mm) and weights (g) of adult males of three species of *Glauconycteris* with results of Student's *t*-tests.

	<i>G. argentata</i>				<i>G. gleni</i>				<i>G. variegata</i>				<i>G. gleni</i> & <i>G. variegata</i>	
	\bar{X}	Range	N	SD	\bar{X}	Range	N	SD	\bar{X}	Range	N	SD		<i>P</i>
A. EXTERNAL														
Total length	99.48	94-106	21	3.265	99.67	96-103	9	2.236	101.63	88-115	19	5.408	> 0.05	
Tail length	46.95	41-45	21	3.413	45.66	44-47	9	1.118	45.72	40-51	18	3.392	> 0.05	
Hind foot	7.14	5-9	21	1.389	8.89	8-10	9	0.651	8.61	7-10	18	0.916	> 0.05	
Ear from notch	11.05	8-13	21	1.627	13.89	13-14	9	0.333	12.47	11-14	16	0.991	> 0.001	
Length of tibia	18.32	17.1-19.5	20	0.671	16.06	15.1-17.0	9	0.771	19.34	18.3-20.5	19	0.829	> 0.001	
Length of forearm	41.11	39.4-42.7	22	1.030	40.17	38.0-41.5	9	1.202	41.73	39.7-43.2	18	0.831	> 0.005	
3rd Digit: Metacarpal	41.20	38.7-43.0	22	1.201	40.10	37.0-42.2	9	1.636	40.40	38.3-41.9	19	0.924	> 0.05	
Phalanx 1	14.18	13.0-16.1	22	0.766	15.46	14.4-16.6	9	0.648	15.64	15.1-16.3	19	0.347	> 0.05	
Phalanx 2	23.19	20.0-24.9	22	1.241	21.50	21.0-23.3	9	1.481	21.58	20.0-23.0	18	0.984	> 0.05	
4th Digit: Metacarpal	38.98	37.0-41.0	22	1.356	38.42	35.9-40.2	9	1.481	39.31	37.7-40.6	19	0.911	> 0.05	
Phalanx 1	10.84	9.5-11.6	22	0.533	10.74	9.8-11.7	9	0.781	11.50	11.0-12.0	19	0.353	> 0.03	
Phalanx 2	11.27	10.4-12.0	22	0.567	10.48	9.7-11.3	9	0.502	11.47	10.0-12.4	19	0.635	> 0.001	
5th Digit: Metacarpal	35.26	33.3-36.9	22	1.020	35.13	33.3-36.8	9	1.238	37.47	35.4-39.4	19	1.168	> 0.001	
Phalanx 1	8.84	7.3-9.8	22	0.553	8.37	7.4-9.0	9	0.543	9.20	8.5-9.9	19	0.348	> 0.005	
Phalanx 2	7.18	6.2-8.5	22	0.730	5.83	5.0-6.5	9	0.487	7.27	6.2-8.7	19	0.648	> 0.001	
Wingspan	310.0	292-329	20	10.490	298.3	290-305	7	5.559	311.2	300-320	6	6.735	> 0.005	
Weight	7.99	6-10	17	1.452	10.44	9.5-12.0	9	0.768	11.45	6-14	10	2.314	> 0.05	
B. CRANIAL														
Greatest length	12.76	12.1-13.2	21	0.242	14.10	13.85-14.55	8	0.215	13.99	13.55-14.5	16	0.256	> 0.05	
Condylbasal length	12.38	11.7-12.9	21	0.337	13.74	13.4-14.0	7	0.190	13.43	12.85-13.8	16	0.266	> 0.01	
Palatal length	4.05	3.7-4.4	20	0.171	4.26	4.0-4.5	9	0.199	4.33	4.2-4.6	18	0.119	> 0.05	
Zygomatic width	9.25	8.8-9.5	17	0.206	9.85	9.5-10.1	8	0.225	10.41	10.0-10.7	10	0.208	> 0.001	
Mastoid width	8.30	8.0-8.5	21	0.173	8.39	8.1-8.7	8	0.249	8.95	8.7-9.2	17	0.173	> 0.001	
Breadth of braincase	7.77	7.4-7.9	15	0.142	8.02	7.7-8.25	9	0.192	8.04	7.7-8.5	9	0.270	> 0.05	
Height of braincase	5.71	5.4-5.9	21	0.133	5.72	5.55-6.0	6	0.197	5.97	5.6-6.2	17	0.165	> 0.01	
Interorbital width	5.45	5.1-5.7	21	0.170	5.51	5.2-5.7	9	0.188	5.78	5.5-6.0	18	0.128	> 0.005	
Postorbital process	5.55	5.2-5.8	21	0.194	5.46	5.2-5.9	9	0.214	5.86	5.5-6.2	18	0.169	> 0.001	
Postorbital constriction	4.72	4.4-5.0	21	0.174	4.34	3.95-4.6	9	0.202	4.52	4.2-4.8	17	0.153	> 0.03	
M ³ -M ³	6.10	5.8-6.4	21	0.178	6.32	6.15-6.45	9	0.114	6.89	6.3-7.1	18	0.187	> 0.001	
C-C ³	4.16	4.0-4.35	21	0.096	4.72	4.5-4.85	9	0.103	4.86	4.75-5.2	18	0.108	> 0.005	
C-C (upper)	4.36	4.1-4.5	20	0.122	4.64	4.3-4.75	9	0.167	4.92	4.7-5.2	18	0.133	> 0.001	
Mandible length	8.99	8.8-9.3	21	0.155	10.01	9.9-10.2	9	0.114	10.17	9.7-10.6	18	0.213	> 0.05	
C-M ₃	4.66	4.4-4.9	20	0.139	5.10	4.9-5.25	9	0.114	5.43	5.3-5.7	18	0.126	> 0.001	
C-C (lower)	2.81	2.7-3.05	20	0.110	2.94	2.9-3.1	9	0.077	3.28	3.0-3.5	17	0.143	> 0.001	

TABLE II

Measurements (mm) and weights (g) of three species of *Glauconycteris* with results of Student's *t*-tests.

	<i>G. argentata</i>				<i>G. gleni</i>				<i>G. variegata</i>				<i>G. gleni</i> & <i>G. argentata</i>	<i>G. variegata</i>
	\bar{X}	Range	N	SD	\bar{X}	Range	N	SD	\bar{X}	Range	N	SD		
A. EXTERNAL														
Total length	100.97	94-114	41	4.492	101.50	97-106	6	3.391	105.00	100-108	8	3.625	> 0.05	> 0.05
Tail length	46.33	41-53	42	3.266	46.00	45-50	6	2.098	48.50	43-53	8	4.000	> 0.05	> 0.05
Hind foot	7.64	6-10	42	1.326	8.75	8-9	6	0.418	9.22	8-10	9	0.667	> 0.05	> 0.05
Ear from notch	11.83	9-14	42	1.228	14.91	14-16	6	0.665	12.81	11-14	8	1.067	> 0.005	> 0.005
Length of tibia	18.29	16.9-19.6	41	0.634	16.43	15.5-17.0	6	1.037	19.47	18.4-21.0	9	0.907	> 0.005	> 0.005
Length of forearm	42.00	40.0-43.7	45	0.937	41.17	40.0-42.0	6	0.671	42.91	41.0-44.7	12	1.278	> 0.005	> 0.005
3rd Digit: Metacarpal	42.36	39.2-45.4	45	1.199	41.43	40.2-42.6	6	0.916	41.32	39.5-44.7	12	1.304	> 0.05	> 0.05
Phalanx 1	14.84	13.7-16.0	45	0.614	15.60	15.2-16.7	6	0.583	16.07	14.6-17.0	12	0.775	> 0.05	> 0.05
Phalanx 2	23.72	21.5-25.1	44	0.860	22.08	21.1-23.3	6	0.900	22.39	18.0-24.5	12	1.671	> 0.05	> 0.05
4th Digit: Metacarpal	40.43	38.6-43.0	45	1.071	39.10	37.8-41.1	6	1.180	40.30	38.8-42.4	12	1.146	> 0.05	> 0.05
Phalanx 1	11.07	10.3-12.0	45	0.495	11.02	10.3-11.5	6	0.421	11.77	11.0-12.9	12	0.494	> 0.05	> 0.05
Phalanx 2	11.28	10.3-12.3	45	0.549	11.07	9.7-11.7	6	0.816	11.33	9.8-12.0	12	0.741	> 0.05	> 0.05
5th Digit: Metacarpal	36.39	34.4-38.4	45	0.960	35.47	33.6-36.9	6	1.218	38.24	36.6-39.3	12	1.003	> 0.001	> 0.001
Phalanx 1	9.13	8.3-10.0	45	0.429	8.28	7.8-8.7	6	0.392	9.36	8.4-10.5	12	0.533	> 0.001	> 0.001
Phalanx 2	7.12	6.1-8.3	45	0.529	6.70	6.3-7.0	6	0.261	7.14	6.3-7.5	12	0.392	> 0.03	> 0.03
Wingspan	313.8	290-333	37	9.863	305.0	299-310	6	3.578	323.5	323-324	2	0.707	> 0.001	> 0.001
Weight	10.0	7.1-12.0	27	1.754	11.22	8.5-15.0	6	2.534	10.25	8-13	4	2.061	> 0.05	> 0.05
B. CRANIAL														
Greatest length	12.90	12.3-13.3	40	0.209	14.08	13.9-14.3	5	0.164	14.07	13.7-14.5	7	0.269	> 0.05	> 0.05
Condylobasal length	12.57	12.0-12.8	41	0.226	13.78	13.6-14.1	5	0.205	13.46	13.0-13.8	7	0.292	> 0.05	> 0.05
Palatal length	4.20	3.9-4.6	42	0.171	4.28	4.1-4.4	6	0.147	4.46	4.2-4.7	7	0.184	> 0.05	> 0.05
Zygomatic width	9.39	8.9-9.7	31	0.197	9.90	9.4-10.1	5	0.291	10.29	9.85-10.6	6	0.269	> 0.05	> 0.05
Mastoid width	8.37	7.7-8.7	44	0.207	8.56	8.3-8.8	5	0.207	8.93	8.7-9.1	7	0.150	> 0.005	> 0.005
Breadth of braincase	7.75	7.55-8.0	33	0.110	8.07	7.7-8.2	5	0.211	8.15	7.9-8.5	4	0.252	> 0.05	> 0.05
Height of braincase	5.69	5.3-6.0	43	0.124	5.80	5.6-5.9	5	0.122	6.01	5.85-6.3	7	0.149	> 0.03	> 0.03
Interorbital width	5.54	5.3-5.8	43	0.132	5.45	5.2-5.75	6	0.214	5.71	5.5-5.9	7	0.134	> 0.03	> 0.03
Postorbital process	5.69	5.3-6.1	43	0.153	5.32	5.1-5.65	6	0.209	5.88	5.7-6.0	7	0.118	> 0.005	> 0.005
Postorbital constriction	4.72	4.5-4.9	44	0.116	4.32	4.2-4.5	6	0.103	4.61	4.5-4.8	7	0.110	> 0.001	> 0.001
M ² -M ³	6.21	5.95-6.5	42	0.148	6.37	6.05-6.5	6	0.166	6.86	6.7-7.0	7	0.131	> 0.001	> 0.001
C-C	4.26	4.1-4.45	42	0.106	4.72	4.6-4.85	6	0.082	4.88	4.7-5.2	7	0.163	> 0.05	> 0.05
C-C (upper)	4.46	4.2-4.7	41	0.110	4.59	4.5-4.65	6	0.049	4.87	4.7-5.05	7	0.129	> 0.005	> 0.005
Mandible length	9.13	8.7-9.5	41	0.210	10.08	9.9-10.3	6	0.147	10.16	9.9-10.55	7	0.205	> 0.05	> 0.05
C-M ₂	4.70	4.35-4.9	38	0.118	5.22	5.2-5.3	6	0.041	5.43	5.2-5.8	7	0.198	> 0.05	> 0.05
C-C (lower)	2.88	2.6-3.1	34	0.170	2.90	2.75-3.0	6	0.122	3.41	3.0-3.5	6	0.111	> 0.001	> 0.001



width to that of *G. variegata*) and a narrower mastoid width. The upper inner incisor is usually bilobate, but the development of the posterior lobe varies considerably in individual specimens. The upper premolar has a large hypocone with its lingual margin lying in line with the lingual margins of the canine and the first molar (M^1) in occlusal view (Fig. 2). The lower incisors are typically trilobate (Fig. 3), but the outer incisor (I_3) has a well-developed cingulum extending along its anterior surface below the central lobe. The occlusal surfaces of I_3 and I_2 are each characterized by the development of a posterior projection of the cingulum to form a heel-like lobe (Fig. 4).

Measurements (mm) of the holotype—*External*: Total length 100, tail vertebrae 46, hind foot 8, ear 16, tibia 16.4, forearm 41.1, third digit – metacarpal 40.2, first phalanx 15.2, second phalanx 21.3, fourth digit – metacarpal 37.8, first phalanx 10.9, second phalanx 9.7, fifth digit – metacarpal 34.9, first phalanx 7.8, second phalanx 6.9, wing span 305, weight 9.25 grams. *Skull*: Greatest length 14.2, condylobasal length 13.6, palatal length 4.1, zygomatic width 9.9, mastoid width 8.4, breadth of braincase 8.2, height of braincase 5.9, supraorbital process width 5.3, interorbital width (from front) 5.2, postorbital constriction 4.5, width across molars (M^3 – M^3) 6.4, length of toothrow (C – M^3) 4.75, width across upper canines (C – C) 4.6, length of mandible (condylo-incisive) 9.9, length of lower toothrow (C – M_3) 5.2, width across lower canines (C – C) 3.0.

Specimens examined—*Glauconycteris gleni* sp. n.—The holotype from Cameroun (ROM); plus nine adult and two subadult males, five adult and one subadult females

all from Malabigambo Forest near Sango Bay, Masaka District, southern Uganda in the collection of the Los Angeles County Museum. *G. argentata* (Dobson) – Cameroun, 8; French Congo, 2; Uganda, 6; Kenya, 49; Tanzania, 5. *G. variegata* (Tomes) – Cameroun, 2; Congo, 11; Dahomey, 2; Ghana, 2; Nigeria, 2; Zambia, 2; Sudan, 1; Uganda, 9; Malawi, 1; South Africa (Zululand), 1. *G. alboguttatus* J.A. Allen – Cameroun, 1; Congo, 1. *G. beatrix* Thomas (including *G. humeralis* J.A. Allen) – French Congo, 1; Gabon, 1; Congo, 5; Uganda, 9; Kenya, 6. *G. egeria* Thomas – Cameroun, 1; Uganda, 4. *G. machadoi* Hayman – Angola, 1. *G. superba* Hayman – Congo, 1; Ghana, 1; Ivory Coast, 1.

Comparisons—*Glauconycteris gleni* appears morphologically intermediate between *G. argentata* and *G. variegata*. Externally, *G. gleni* resembles a pale-coloured *G. argentata* in the venation of the interfemoral membrane, but markings are considerably darker and the membrane much whiter. *G. gleni* lacks the dorsolateral bands of pale-coloured pelage on the back, characteristic of *G. argentata*, and the white ventral pelage contrasts sharply with the dark-greyish or brownish coloration of that species. The ear of *G. gleni* is larger, the tragus is wider, and the tibia is distinctly shorter than in *G. argentata*. *G. gleni* is significantly larger in 11 of 16 external measurements in both sexes (Tables 1 and 2). In cranial characters, *G. gleni* is significantly larger ($P < .001$) without overlap in measurements of greatest length, condylobasal length, length of toothrow (C – M^3), and length of mandible, while the postorbital constriction of *G. gleni* is significantly narrower ($P < 0.001$) in both sexes compared with *G. argentata* (Tables 1 and 2). Of the 16

Fig. 3—Anterior aspect of the lower incisors and canines of the same three specimens shown in Fig. 2 (scale bars = 1 mm). Left, *G. argentata* (C – C 4.5 mm). Centre, *G. gleni* (C – C 4.6 mm)¹. Right, *G. variegata* (C – C 5.0 mm).

Fig. 4—Occlusal aspect of lower jaws of the same specimens shown in Fig. 2 (scale bars = 1 mm). Left, *G. argentata* (length 9.0, C – M_3 4.65 mm). Centre, *G. gleni* (length 9.9, C – M_3 5.2 mm). Right, *G. variegata* (length 9.9, C – M_3 5.3 mm).

cranial characters compared, *G. gleni* and *G. argentata* males differed significantly in 12 and females in 10. In dental morphology, specimens of *G. gleni* tended to differ from those of *G. argentata* in having a larger hypocone on the upper premolar and in the development of the cingula on the anterior surface of the crown of I_3 , as well as on the posterior portion of both I_2 and I_3 (Figs. 2–4).

When compared with *G. variegata*, *G. gleni* lacks the heavily pigmented markings on the wings, and the markings on the inter-femoral membrane are less complex (typically, lines are laterally oriented and antero-posterior orientation of cross-veination is limited). The coloration of the pelage is strikingly different from any known example of *G. variegata*. The dorsal pelage is distinctly quadricoloured instead of tricoloured as in *G. variegata*. Although similar in shape, the ears are longer and the tragi are broader in the new species. The tibia of *G. gleni* is distinctly shorter (17.0 or less) than that of *G. variegata* (18.3 or more; see Tables 1 and 2). Of the 16 external measurements (Tables 1 and 2), *G. gleni* males are significantly smaller in nine and females in eight when compared with *G. variegata*. Although the crania of the two species are similar in size, differences are significant in 13 of the 16 measurements in males and 10 of the 16 in females. In dental morphology, *G. gleni* also differs from *G. variegata* by the shorter first commissure and longer third commissure of M^3 and by the greater development of the hypocone of P^4 (Fig. 2), as well as by minor differences in the development of the cingula of the lower incisors (Figs. 3 and 4).

Each of the remaining known species of *Glauconycteris* can be distinguished from *G. gleni* as follows:

G. poensis (Gray) – wings pale gray instead of white, general pelage coloration darker, and greatest length of skull less than 13.0.

G. alboguttatus Allen – pelage coloration much darker, wing membranes dark instead

of white, tibia greater than 17.0, and greatest length of skull shorter (13.1 and 13.2).

G. beatrix Thomas – pelage and wing membranes dark, ear shorter (12.0 or less), skull shorter (greatest length, 12.0 or less), and length of mandible less than 9.0.

G. egeria Thomas – pelage and wing membranes quite dark combined with striking whitish dorsolateral stripes on the back, larger square-shaped ears, greatest length of skull less than 13.5, and length of mandible less than 9.5.

G. machadoi Hayman – darker pelage coloration, as well as wing and interfemoral membranes with sharply defined veinations; otherwise differs in the same way as *G. variegata*.

G. superba Hayman – pelage black and white above, black below, forearm length greater than 44.0, greatest length of skull more than 16.0.

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